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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/507,015	04/11/2005	Lorenzo Farone	1340-12	7682
23117 7590 06/19/2008 NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203				
EXAMINER				
BRYANT, MICHAEL C				
ART UNIT		PAPER NUMBER		
2884				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/507,015

**Applicant(s)**

FARAONE ET AL.

**Examiner**

CASEY BRYANT

**Art Unit**

2884

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 27 February 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-58 and 60 is/are pending in the application.
- 4a) Of the above claim(s) 1-25, 36-58 and 60 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 26-35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 September 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statements(s) (PTO/SB08)
- Paper No(s)/Mail Date 9/8/2004.
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Examiner notes Applicant's election of Group II, claims 26-35, in the response received 2/27/2008. However, Group I has been amended to now comprise claim 60, originally of Group II. The Examiner notes that claim 60 is more relevant to, and depends from claim 36 of Group I. Thus claim 60 has been withdrawn from consideration.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 31 recites the limitation "said support structures" in line 2. There is insufficient antecedent basis for this limitation in the claim. Claim 26 recites only a single support structure located at a periphery of the membrane.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 26-29, 34 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Sirbu et al.** (US 2002/0131458 A1).

With respect to claim 26, Sirbu discloses a tunable cavity filter [0020](Figure 1) comprising a substrate **11** [0029, 0038]; a deformable membrane **23** disposed parallel relationship to the substrate **11** and suspended at the periphery of the membrane **23** by a support structure **17** [0013, 0030]; a pair of reflectors **12a-b**, a first reflector layer **12b** disposed in fixed relationship upon the substrate **11** and the other being a second reflector layer **12a** disposed on the membrane **23** to form a resonant cavity **14**, the reflectors being disposed a cavity length from each other [0013, 0028]; the membrane **23** and one reflector being shaped in a prescribed membrane geometry; and a pair of electrodes **26** juxtaposed therewith, the first electrode with the first reflector and the second electrode with the second reflector [0028]; wherein the membrane **23** is of substantially uniform thickness and has an intrinsic stress to permit electrostatic displacement of the membrane over distances for tuning in the infrared band using relatively low voltages applied to the electrodes [0013, 0028-0029]. While Sirbu does not specifically disclose the applied voltages as commensurate with read out integrated circuit electronics associated with the resonator, Sirbu does disclose the tunable cavities having applications in wavelength division-multiplexing LAN systems. It would have been obvious to one of ordinary skill in the art at the time the invention was made to specify the tunable cavity disclosed by Sirbu as operable in a voltage range

commensurate with the circuit electronics of a given application to reduce cost, and hardware that would be necessary for voltage conversion to operate otherwise [0002].

With respect to claim 27, Sirbu discloses wherein the substrate material is a semiconductor that provides access to the optical wavelengths necessary for resonance purposes in the resonant cavity [0027, 0038].

With respect to claim 28, Sirbu discloses the cavity length corresponding to optical wavelengths in the infrared region [0029].

With respect to claim 29, Sirbu disclose the displacement of the membrane up to the substantially the full cavity length [0009].

With respect to claim 34, Sirbu disclose the electrodes formed separately of the reflective layers (Figure 1).

With respect to claim 35, Sirbu discloses the reflective layers deformable by tuning of an applied voltage. It would have been obvious to one of ordinary skill in the art to directly apply the electrical contact to the reflective layer in order to reduce manufacturing costs of applying additional conductive layers.

6. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Sirbu et al.** in view of **Larson et al.** (Larson, M.C. and J.S. Harris, Jr., Broad Tunable Resonant-Cavity Light Emission, Appl. Phys. Lett. **67** (5), 31 July 1995).

With respect to claim 30, Sirbu discloses a deformable membrane formed of a series of GaAs/AlGaAs layers, but fails to disclose the deformable membrane formed of

silicon nitride [0030]. Huang discloses a tunable cavity filter comprising a membrane layer formed of silicon nitride. It would have been obvious to one of ordinary skill in the art at the time the invention was made to specify the membrane formed of silicon nitride, as taught by Larson, in order to provide a cavity with a tunable phase shift and total reflectance around 95% (abstract; p. 590, col. 1).

7. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Sirbu et al.** in view of **Lipson et al.** (US 6,567,209).

With respect to claim 31, Sirbu discloses the support structures formed of stacks of AlGaAs/GaAs [0029], but fails to disclose supports formed of zinc sulfide. Lipson discloses a pair of distributed Bragg reflectors (DBRs) having a support material located there between formed of ZnS. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use ZnS as support material because of its suitable optical properties in Bragg reflector cavities (col. 3, line 60 – col. 4, line 15; col. 4, line 43-col. 5, line 3).

8. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Sirbu et al.** in view of **Cole et al.** (US 5,550,373).

With respect to claim 33, Sirbu disclose the device as a tunable resonant photodetector [0021], but does not specifically disclose a substrate formed of MCT. Cole discloses an infrared detector having a tunable cavity, the detector having a

sensing substrate formed of MCT (col. 2, lines 42-44). It would have been obvious to one of ordinary skill in the art at the time the invention was made to specify the tunable cavity photodetector of Sirbu having a sensing substrate formed of MCT, as taught by Cole, in order to provide an tunable cavity photodetector sensitive in the infrared spectrum.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CASEY BRYANT whose telephone number is (571)270-1282. The examiner can normally be reached on Monday - Friday, 8am - 5pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Porta can be reached on (571)272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Casey Bryant  
Patent Examiner  
GAU 2884

/Christine Sung/  
Primary Examiner, Art Unit 2884